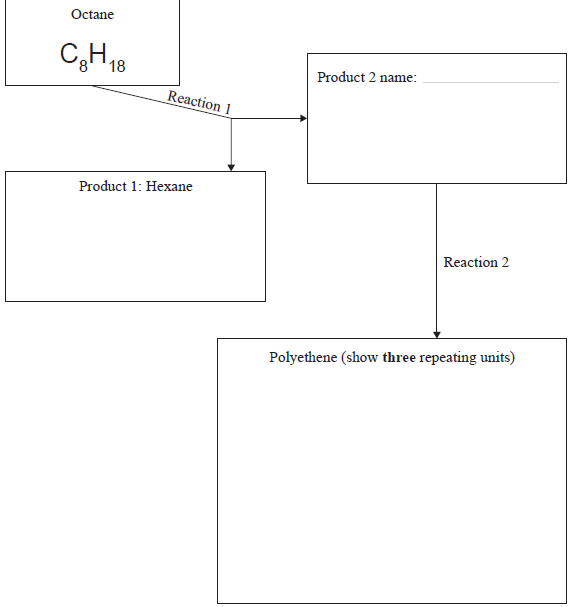
**Polymers**

**1.** Octane can be used to produce the polymer, polyethene. Octane undergoes Reaction 1 to form hexane and Product 2. Product 2 can be used to produce

polyethene.

(i) Complete the reaction scheme by filling in the boxes to show all structural formulae, as well as the name for Product 2.

****

(ii) Elaborate on Reaction 1 and Reaction 2. In your answer, you should:

• name the types of reactions occurring

• give the conditions required for each reaction

• explain how polyethene can be made from Product 2.

**2.** Explain how the structure of ethene allows it to form polyethene

**3.** Outline fully the chemical reaction between monomers to form the following polymers

|  |  |
| --- | --- |
| **name of polymer** | **chemical reaction** |
| polyethene (polythene) |  |
| polypropene  (polypropylene) |  |

**4.** Polymers are very large molecules made up of many small repeating units. Explain why an alkene such as ethene can be used to make polymers, while an alkane such as ethane cannot. You may draw diagrams as part of your explanation.

**5.**  Polymers are used in the production of plastics. Plastic pollution is becoming a planet-wide problem, with much of the waste plastic ending up in our

oceans. Polyethene (polythene) and polypropene (polypropylene) both float on the ocean’s surface, forming part of the large floating islands of plastic waste

that form where ocean currents meet.

Explain why the polymers polyethene and polypropene form part of these floating islands of plastic. In your answer:

• describe the chemical structure and bonding of these polymers

• explain the chemical reactivity of these polymers.

**6.** Explain why alkenes can be used to make polymers, but alkanes cannot.

Polypropene (polypropylene) has many uses that are linked to its chemical and physical properties. Name TWO uses of polypropene.

Link each use to TWO physical and / or chemical properties of polypropene.

**7.** Polyethene is available in both a low density (LDPE) and high density (HDPE) form. Some properties of LDPE and HDPE are given in the table below.



Explain why LDPE is used to make plastic food wrap and HDPE is used to make plastic drink bottles, by analysing the properties provided in the table above.

Explain why polyethene is a non-biodegradable substance.

**8.** Polypropene has many uses that are related to its properties. Describe TWO uses of polypropene and link these uses to named physical and chemical properties of polypropene.

**9.**  Ethene is used to make the polymer **polyethene**. Polyethene has many different uses, for example plastic bags. Some uses of polyethene rely on its toughness. Discuss the process of the polymerisation of ethene into polyethene. In you answer, you should:

• draw diagrams to show the chemical structure of ethene and polyethene

• explain why polyethene is tough by referring to its chemical structure

• fully explain the chemical reaction that occurs between ethene molecules to form polyethene.

**10.** Ethene is a useful chemical. It is used to make many useful products such as polymers. What is a polymer?

Explain how ethene molecules join together to form polyethene. Include in your answer the conditions required for this reaction to occur.

© 2017 <http://www.chemicalminds.wikispaces.com>

NCEA questions and answers reproduced with permission from NZQA